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Revision of *Oncotophasma* Rehn (Insecta: Phasmatodea: Diapheromeridae)

Oliver Zompro

Abstract

The Central American genus *Oncotophasma* Rehn, 1904 (= *Paradiapheromera* Brunner v. Wattenwyl, 1907) (Phasmatodea: Diapheromeridae: Diapheromerinae: Diapheromerini) is revised. The genus contains eight species, of which three are described for the first time: *Oncotophasma limonense* **n. sp.**, *O. maculosum* **n. sp.** and *O. weitschati* **n. sp.** Listings of museum-material and keys to species are included.
Keywords: Phasmatodea, *Oncotophasma*, revision, new species, Central America.

Zusammenfassung

Die mittelamerikanische Gattung *Oncotophasma* Rehn, 1904 (= *Paradiapheromera* Brunner v. Wattenwyl, 1907) (Phasmatodea: Diapheromeridae: Diapheromerinae: Diapheromerini) wird revidiert. Die Gattung enthält acht Arten, von denen drei erstmalig beschrieben werden: *Oncotophasma limonense* **n. sp.**, *O. maculosum* **n. sp.** und *O. weitschati* **n. sp.** Das in den verschiedenen Sammlungen vorhandene Material wird aufgelistet und ein Schlüssel zu den Arten präsentiert.

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1 Introduction

The Stick Insects of the New World have been comparatively poorly studied. Since BRUNNER V. WATTENWYL (1907) & REDTENBACHER (1906, 1908) published their famous monograph "Die Insektenfamilie der Phasmiden" only HEBARD and REHN have concentrated on this fauna in various publications, and only a few taxa have been added by various authors afterwards. ZOMPRO (2001a) revised the genera of the family Diapheromeridae, which has been named Heteronemiidae by all other authors until ZOMPRO (2001b) revealed the true position of the type species *Heteronemia mexicana* Gray, 1835 and transferred it from the "Anareolatae" into the Areolatae. Subsequently ZOMPRO (2004) revised the genera of the Areolatae and established a new phylogeny for the order, followed by a key to the New World genera of the Phasmatodea (2005). During all this work it became obvious that dozens, if not hundreds of as yet unknown New World species present in museum collections await their description.

In the present study the genus *Oncotophasma* Rehn, 1904 (Diapheromeridae: Diapheromerinae: Diapheromerini: *Clonistria* group) is revised. To date, *Oncotophasma* comprises five species: *O. armata* Brunner v. Wattenwyl, 1907, *O. coxata* (Brunner v. Wattenwyl, 1907), *O. martini* (Griffini, 1896), *O. modestum* (Brunner v. Wattenwyl, 1907) and *O. podagricum* (Stål, 1875). *Oncotophasma limonense* n. sp., *O. maculosum* n. sp. and *O. weitschati* n. sp. are described for the first time here, raising the total number of species to eight.

The genus is distributed in Southern Central America, from Costa Rica to the North of Colombia.

ROBINSON (1968) described the defensive-behaviour of the type species *O. martini*.

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2 Materials and methods

Material has been examined from most European museums and from the author's collection. Fresh material was preserved in the method described by ZOMPRO (1996). The examinations were executed using a Zeiss Jena Citoval-2 stereoscope and drawings were made using a drawing tube. Measurements were taken using a MBC-9 stereoscope with a scale ocular. All photoworks were executed with a Medion 9700 4-Mpixel digital camera.

Acronyms of depositories

ANSP	Academy of Natural Sciences, Philadelphia, USA
BMNH	The Natural History Museum, London, England
DEI	Deutsches Entomologisches Institut, Müncheberg (formerly Eberswalde), Germany
MHNG	Museum d'Histoire naturelle, Geneva, Switzerland
MIZT	Museo Regionale di Scienze Naturali, Torino, Italy
MNHN	Museum national d'Histoire naturelle, Paris, France

MTD	Museum für Tierkunde, Dresden, Germany
NHMW	Naturhistorisches Museum, Vienna, Austria
NHRS	Naturhistoriska Riksmuseet, Stockholm, Sweden
OZ	Private collection O. Zompro, Kiel, Germany (affiliated with ZMUK)
SMNS	Staatliches Museum für Naturkunde, Stuttgart, Germany
ZMB	Zoologisches Museum der Humboldt-Universität, Berlin, Germany
ZMH	Zoologisches Museum der Universität Hamburg, Germany
ZMUK	Zoologisches Museum der Christian-Albrecht-Universität, Kiel, Germany

3 Taxonomy

3.1 The genus *Oncotophasma* Rehn, 1904

Oncotophasma Rehn, 1904: Rehn 1904: 59. – Kirby 1904: 59; Hebard 1922: 358; Zompro 2001a: 228, 2004: 316, 2005: 142; Otte & Brock 2005: 233. – Type species: *Bostra martini* Griffini, 1896, by original designation. Gender: Neuter.

= *Paradiapheromera* Brunner v. Wattenwyl, 1907: Brunner v. Wattenwyl 1907: 317. – Shelford 1909: 347; Hebard 1922: 358 (synonymised with *Oncotophasma*). – Type species: *Paradiapheromera strumosa* Brunner v. Wattenwyl, 1907, by monotypy. Gender: Neuter.

Diagnosis

Diapheromerini: *Clonistria* group. ♂♀. Within the *Clonistria* group *Oncotophasma* is characterised in ♂♂ by the lack of lateral nodes on tergite X and by a metanotum, which often has a different structure on the anterior and posterior parts. In ♀♀ the supra-anal plate is short and the subgenital plate projects considerably beyond the tip of the abdomen. The body lacks spines and leaf-like appendices. ♂♂ with minute rudiments of tegmina.

Description

(after Rehn 1904: 59, corrected and extended by Zompro 2001a: 229 and here)

♂♀. Medium to large sized members of the *Clonistria*-group. ♂ reddish brown, ♀ light brown, yellow or green. Body not armed.

Head: Longer than wide, unarmed, parallel sided. Scapus flattened, longer than wide, pedicellus half as long and wide, cylindrical. Antennae projecting well beyond apex of abdomen (♂) or reaching at least abdominal segment V (♀). Head indistinctly longer and wider than pronotum. Eyes projecting hemispherically.

Thorax: Mesonotum of ♂ elongated, at least twice as long as metanotum, considerably narrower than pronotum. Anterior half of ♂ metanotum smooth, built normally; posterior part, at least dorsally, structured differently, often rough and swollen. Mesonotum of ♀ of similar width as pronotum, more than twice as long as metanotum, smooth or granulated.

Legs: Profemora curved and compressed basally, three-edged, tibiae longer than profemora, probasitarsi equal in length or longer than following tarsomeres. Meso- and metafemora four-edged, with at least one apical spine in the meso- and at least two spines in the metafemora. Mesobasitarsi as long as, metabasitarsi longer than combined length of following tarsal segments. Metafemora of ♂ broadened, often with several prominent spines ventrally. All tarsal segments slightly furrowed dorsally, as in *Clonistria* Stål, 1875.

Abdomen: Median segment one-third (♂) or half (♀) of length of abdominal seg-

ment II. III to IV longer than II, of equal width (♂) or wider than others (♀), VII as long as II. ♂ segment VIII widened proximally, widest segment, as long as IX, longer than X. Anterior half of IX with impression laterally. Subgenital plate rounded, with broad posterior margin. ♂ vomer broad triangular. – ♀: Segments VIII and IX of similar length, longer than X. Subgenital plate projecting beyond apex of abdomen by length of VIII, furrowed ventro-apically, lateral margins turned upwards, touching each other dorsally and forming a closed tube in the posterior half. Sternite VII with preopercular organ.

Egg: Capsule elongate, flattened bullet-shaped, straight ventrally, curved dorsally, surface covered with irregular keels. Colour brown. Micropylar plate elongated oval, one-third of length of capsule, median line present, reaching polar-area. Operculum inserted in a negative angle of 70°, oval, with sharp, elevated margin, set with hair-like structures.

Distribution

Central and northwestern South America (Costa Rica to Colombia).

3.2 *Oncotophasma armatum* (Brunner v. Wattenwyl, 1907) (Figs. 6f, 7f, 8f, 9f, 10f)

Paradiapheromera armata Brunner v. Wattenwyl, 1907: Brunner v. Wattenwyl 1907: 317. – Original type data: "♂. Chiriqui (Coll. Godman)"; Type in BMNH. – Shelford 1909: 347, pl. 5: 3.
Oncotophasma armatum: Zompro 2001a: 228; Otte & Brock 2005: 233.

Material examined (1 ♂)

Holotype ♂: V. de Chiriqui, 4000–6000 ft., Champion [BMNH].

Diagnosis

♂. Differing from other *Oncotophasma* species by the presence of two metanotal tubercles. – ♀ and egg unknown.

Distribution

Panama. Only known from the type locality.

Description

♂. General colour of dried specimen various shades of brown. Body slightly shiny.

Head (Fig. 6f): Dark brown with light brown spots. Longer than wide, narrowed posteriad behind eyes. Slightly impressed between bases of antennae. Occiput with a short, dorsomedian impression. With a light stripe behind eyes. Eyes projecting hemispherically. Antennae projecting beyond abdomen. Scapus flat cylindrical, black. Pedicellus half as long, two-thirds as wide, also black. Following antennomeres brown, elongate.

Thorax: Pronotum slightly shorter and narrower than head, with cross-shaped impression, its lateral margin slightly emarginated. Mesonotum with fine median carina, more than 4 times as long and as wide as pronotum, slightly broadened at mesocoxae. Metanotum less than half as long as mesonotum; anterior half roughly structured, posterior half bearing two large tubercles (Fig. 7f).

Legs: Profemora brown with irregular darker spots, strongly curved and compressed basally, trapezoid in cross-section, with granulate carina ventromedially. Protibiae straight, trapezoid in cross-section, slightly shorter than profemora. Protarsi (Fig. 8f) about half as long as protibiae. Probasitarsi longer than following four tarsomeres combined, 3 times as long as second segment; third segment half as long as second, twice as long as fourth; fifth tarsomere as long as third and fourth combined. Mesofemora trapezoid in cross-section, edges as well as ventromedian carina slightly serrate to granulate, bearing two large ventromedian teeth before knee. Mesotibiae about as long as mesofemora, trapezoid in cross-section, with strongly raised carina ventromedially. Mesotarsi slightly longer than half length of mesotibiae. Mesobasitarsi slightly shorter than following four tarsomeres; second segment one-third as long as mesobasitarsi; third two-thirds as long as second; fourth half as long as third; fifth as long as third and fourth combined. Metafemora (Fig. 9f) broadened, trapezoid in cross section, with broad raised ventromedian carina, this bearing five large spines, their distance decreasing and their length increasing apicad; between these spines with several distinctly smaller spines. Metatibiae longer than metafemora, trapezoid in cross-section, with raised and strongly spinose carina ventromedially; dorsal edges of Metatibiae granulate, ventral edges serrate. Metatarsi half as long as metatibiae. Metabasitarsi distinctly longer than combined length of following four tarsomeres, with granulate carina ventromedially; second segment less than one-third as long as first; third half as long as second; fourth half as long as third; fifth as long as third and fourth combined.

Abdomen (Fig. 10f): Median segment about half as long as metanotum. Abdominal segment II slightly longer than median segment. II to V slightly increasing, V to VII decreasing in length. VIII slightly shorter than VII, strongly broadened apicad. IX as long as VI, tectiform. X shorter than VIII, with carina dorsomedially and a broad notch posteriorly. Supra-anal plate slightly projecting, semicircular. Vomer triangular, slightly curved upwards apicad. Cerci simple, slender, slightly curved inwards, as long as X. Subgenital plate swollen, elongated posteriorly.

Measurements (length in mm): Body: 54.3; head: 3.1; pronotum: 2.9; mesonotum: 13.5; metanotum: 5.3; median segment: 2.7; profemora: 20.0; protibiae: 17.2; protarsi: 8.8; mesofemora: 11.6; mesotibiae: 11.3; mesotarsi: 6.9; metafemora: 17.1; metatibiae: 18.6; metatarsi: 9.5.

3.3 *Oncotophasma coxatum* (Brunner v. Wattenwyl, 1907) (Figs. 6a, 7a, 8a, 8g, 9a, 9g, 10a, 10g)

Dyme coxata Brunner v. Wattenwyl, 1907: Brunner v. Wattenwyl 1907: 323. – Original type data: "♂. Columbia (Coll. m.)"; Type in NHMW.
Oncotophasma coxatum: Zompro 2001a: 228; Otte & Brock 2005: 233.

Material examined (2 ♂♂, 2 ♀♀)

Holotype ♂: Columbia [NHMW] (abdomen broken off after abdominal segment IV); 1 ♂: Tuis, 1000 m, Costa Rica [MTD] (pin includes remains of a second ♂); 2 ♀♀: Tuis, 1000 m, Costa Rica, 1934 4 [MTD].

Diagnosis

♂♀. Metanotum not swollen, without tubercles or humps, lateral margins parallel. Posterior part of metanotum of same structure as anterior one, not raised dorso-

caudally. Probasitarsi much longer than following four tarsomeres combined. – Egg unknown.

Distribution

Costa Rica, Colombia.

Description

♂. Very slender. General colour light brownish red. Basal half of femora greenish.

Head (Fig. 6a): Slightly longer than wide. Yellowish with dark mark in the middle (holotype) or brown (♂ from Tuis). With a quadrate impression between bases of antennae. Eyes projecting hemispherically. Antennae projecting beyond abdomen considerably. Scapus flattened rectangular, with acute edges. Pedicellus two-thirds as long and wide as scapus, slightly globose. Third antennomere conical, following ones strongly elongate.

Thorax: Pronotum elongate rectangular, narrower than head, with fine anterior and lateral margins. Disc with a cross-shaped impression. Mesonotum strongly elongate, most of it slightly narrower than pronotum. Metanotum (Fig. 7a) as mesonotum, slightly broader, lateral margins parallel.

Legs: Profemora trapezoid in cross-section, strongly curved and compressed basally. Protibiae slightly longer than profemora, trapezoid in cross-section. Probasitarsi (Fig. 8a) much longer than following four segments combined; second tarsomere one-third as long as basitarsi; third half as long as second; fourth half as long as third; fifth segment, including claws, slightly longer than second one. Meso- and metafemora (Fig. 9a) trapezoid in cross-section, before the joint with two major teeth ventromedially. Meso- and metatibiae and tarsi as in forelegs, but basitarsi only slightly longer than following four segments combined, with spine like bristles ventrolaterally in basal one-quarter.

Abdomen (Fig. 10a): Median segment less than one-third as long as metanotum. Abdominal segments I to IV increasing, V to VIII decreasing in length. IV about as long as V. VIII broadened posteriad, posterior half slightly tectiform dorsally. IX strongly tectiform and compressed laterally, as long as VI. X slightly shorter than VIII, slightly narrowed posteriad, with a small notch posteromedially. Cerci slender, slightly curved inwards, half as long as X. Vomer elongate triangular. Subgenital plate bulgy, projecting beyond middle of IX.

Measurements (length in mm): Body: 72.1–74.1; head: 2.9–3.1; pronotum: 2.9–3.1; mesonotum: 16.3–19.3; metanotum: 6.5–7.9; median segment: 1.8–2.8; profemora: 19.9–20.3; protibiae: 23.7; protarsi: 11.3; mesofemora: 16.5–19.3; mesotibiae: 18.3; mesotarsi: 7.6; metafemora: 21.8–23.1; metatibiae: 22.3; metatarsi: 7+.

♀. General colour brown or light brown.

Head: Subrectangular, slightly narrowed posteriad, with a fine impression mediolongitudinally. Eyes projecting almost hemispherically. Antennae filiform, projecting beyond abdominal segment V. Scapus strongly flattened, with sharp edges laterally. Pedicellus slightly globose, two-thirds as long as scapus. Third antennomere conical, about as long as scapus. Following antennomeres strongly elongate.

Thorax: Pronotum rectangular, its lateral margins slightly concave, anterior margin distinct, posterior one absent. Disc with a cross-shaped impression, which is of the same colour as the pronotum in the light brown and whitish in the brown specimen.

Mesonotum strongly elongate, with a fine median line and a few granulae which are lighter in colour. Metanotum as mesonotum, but distinctly less than half as long.

Legs: Profemora trapezoid in cross-section, strongly curved and compressed basally. Profemoral interodorsal carina prominent, strongly lamellate, ventromedian carina slightly raised. Protibiae slightly longer than profemora, trapezoid in cross-section, ventromedian carina slightly lamellate, especially in basal one-quarter. Probasitarsi (Fig. 8g) slightly longer than following four tarsomeres combined; second one one-third as long as basitarsi; third half as long as second; fourth half as long as third; fifth segment, including claws, as long as second one. Meso- and metafemora (Fig. 9g) trapezoid in cross-section, ventromedian carina with several granulae, before the joint with two major teeth. Meso- and metatibiae as in forelegs. Mesotarsi missing in all specimens examined. Metabasitarsi longer than following four segments combined, ventral edges with tooth-like bristles, especially towards the joint; second tarsomere about one-third as long; third half as long as second; fourth less than half as long as third; fifth segment, including claws, slightly longer than second.

Abdomen (Fig. 10g): Median segment less than half as long as metanotum. Abdominal segment II one-quarter longer. I to V increasing, V to VIII decreasing in length. IX slightly shorter than VII but longer than VIII. VIII and IX strongly tectiform. X shorter than VIII, concave posteriorly, supra-anal plate short, roundly triangular. Subgenital plate projecting beyond abdomen by length of VIII, projecting part forming a dorsally closed tube, apex acute.

Measurements (length in mm): Body: 87.1–88.6; head: 4.2–4.7; pronotum: 3.1–3.6; mesonotum: 19.8–21.3; metanotum: 7.5–7.8; median segment: 3.0–3.1; profemora: 19.8–21.7; protibiae: 22.2–23.0; protarsi: 8.7–9.0; mesofemora: 15.0–16.2; mesotibiae: 14.7; mesotarsi: broken off in all specimens examined; metafemora: 19.2–21.0; metatibiae: 21.8–22.7; metatarsi: 10.1–11.1.

3.4 *Oncotophasma limonense* **n. sp.**
(Figs. 1, 2, 6d, 6g, 7d, 8d, 8i, 9d, 9i, 10d, 10i)

Material examined (7 ♂♂, 1 ♀)

Holotype ♂: Costa Rica, Farm Hamburg a. Reventazon, 28.IV.1929, im Urwald, F. Nevermann, Eing. Nr. 149, 1929 [ZMH].

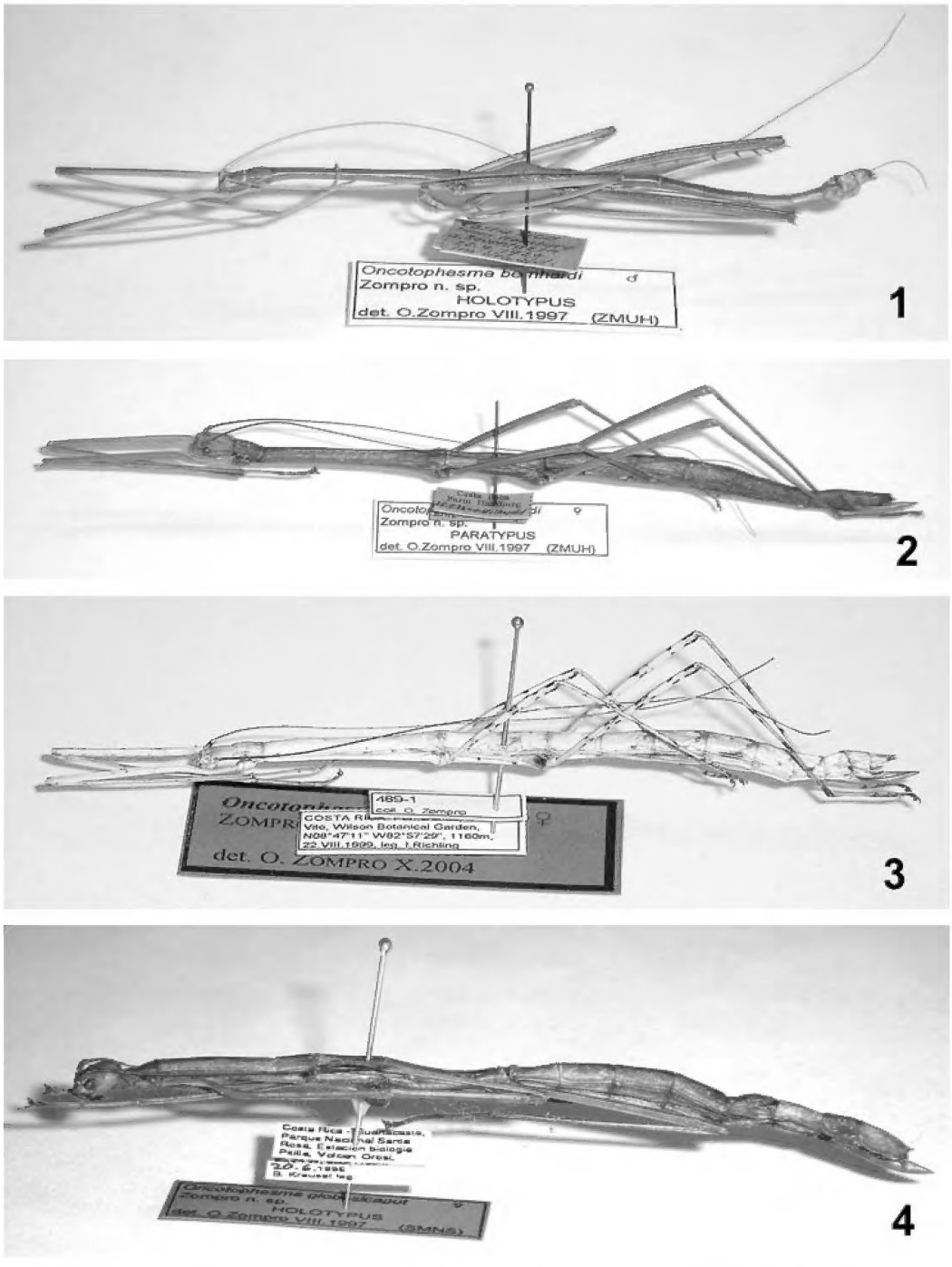
Paratypes: 1 ♂: Costa Rica, Ebene von Limon bei Las Mercedes, Farm Hamburg am Reventazon, 19.I.1923, 10–30 m ü. Meer, 12–30 km vom Atlantik, F. Nevermann leg., ded. 17.III.1923 [ZMH]; 1 ♂: Costa Rica, Ebene von Limon bei Las Mercedes, Farm Hamburg am Reventazon, 25.VI.1923, 10–30 m ü. Meer, 12–30 km vom Atlantik, F. Nevermann leg., ded. 11.IX.1922 [ZMH]; 1 ♀: Costa Rica, Farm Hamburg, 25.V.1936, nachts, Urwald, F. Nevermann leg., Eing. Nr. 41, 1937 [ZMH]; 1 ♂: Costa Rica, Limón, Cahuita NP, coastal forest with palm trees, 4 m, 8.VIII.1999, leg. I. Richling [OZ]; 1 ♂: Reventazon, Costa Rica [MHNG]; 1 ♂: Turrialba, Costa Rica, Heyne, Berlin-Wilm. [DEI]; 1 ♂: Costa Rica, San José, C. Werckle S. G. [ZMB].

Name

After the origin, the Province Limón.

Diagnosis

♂♀. Closely related and similar to *O. martini*, but comparatively slender and longer as well as lighter in colour. ♂ mesonotum slenderer and metanotum less swollen as in *O. martini*, ♂ metafemora with comparatively smaller spines. Swollen



Figs. 1–4. *Oncotophasma* spp. – **1**. *O. limonense* n. sp., holotype, ♂ [ZMH]. **2**. *O. limonense* n. sp., paratype, ♀ [ZMH]. **3**. *O. maculosum* n. sp., holotype, ♀ [OZ]. **4**. *O. weitschati* n. sp., holotype, ♀ [SMNS].

part of mesonotum less wrinkled. Contrasts in ♂ colouration much less distinct than in *O. martini*. ♂ probasitarsi much longer than following four tarsomeres combined. – Egg unknown.

Distribution

Costa Rica.

Description

♂. General colour of dried specimens light orange brown, legs greenish brown. Body slightly shiny.

Head (Fig. 6d): Rectangular, distinctly longer than wide, between bases of antennae with round impression. Clypeus whitish. Vertex with a longitudinal impression medially and two longitudinal impressions submedially. With a whitish brown, elongate triangular area above eyes. Eyes projecting hemispherically. Antennae filiform, projecting considerably beyond apex of abdomen. Scapus flattened. Pedicellus cylindrical, more than half as long as scapus, slightly swollen.

Thorax: Pronotum distinctly longer than wide, emarginated above pro-episternum, marginated anteriorly, this margin }-shaped posteriorly. Pronotum divided by a longitudinal and a transverse impression. Its posterior margin broad, but flat and indistinct. Mesonotum strongly elongate, about 6 times as long as pronotum, narrowest before middle, with few, very indistinct granules. Mesonotum 2.5 times longer than metanotum. Mesosternum smooth, slightly shiny. Anterior half of metanotum (Fig. 7d) more roughly structured than mesonotum; posterior half distinctly swollen, more roughly structured than anterior half. Metasternum also roughly structured.

Legs: Profemora strongly curved and compressed basally. Curved part of profemora green, medium part brown, knees darkened. Ventromedian carina prominent. Protibiae longer than profemora, distinctly longer. Protarsi (Fig. 8d) slightly lighter in colour than protibiae. Probasitarsi trapezoid in cross section, strongly elongate, remaining four tarsomeres combined about two-thirds of length of probasitarsi. Meso- and metacoxae green. Mesofemora light greenish brown, trapezoid in cross section, with prominent carina ventromedially and two blackish spines ventromedio-apically. Mesotibiae light brownish, with a small spine ventromedio-apically. Mesobasitarsi as protarsi, but mesobasitarsi only slightly longer than combined length of following tarsomeres. Metafemora (Fig. 9d) light brownish, distinctly broadened, with prominent carina ventromedially; this carina bearing several large, black spines (number of specimens examined varying between 2 and 9), between the large spines with numerous smaller ones. Metatibiae elongate and slender, longer than metafemora, ventromedian carina also with large and small spines, but spines much smaller. In metatarsi metabasitarsi distinctly longer than following tarsomeres combined.

Abdomen (Fig. 10d): Metanotum little more than twice as long as median segment, smooth and shining. Median segment a little narrower than anterior half of metanotum. Abdominal segment II twice as long as median segment, III 1.5 times as long as II. VII and V of equal length, as long as median segment and II together. VI as long as II, VII as long as median segment. VIII widened distad to nearly double width of VII. IX slightly narrower than VIII, slightly narrowed distad. X half as long as VIII, impressed mediolongitudinally in posterior two-thirds. Cerci nearly as long as X, slightly curved. Subgenital plate strongly swollen, almost rectangular posteriorly, with weak posterior margin. Vomer triangular, with black apex.

Measurements (length in mm): Body: 69.8–~80 (terminal segments missing in largest specimen); head: 3.4–3.8; pronotum: 3.0–2.4; mesonotum: 17.0–21.2; meta-

notum: 7.2–10.4; median segment: 2.8–4.6; profemora: 20.2–25.1; protibiae: 22.9–27.0; protarsi: 10.2–11.1; mesofemora: 16.0–19.0; mesotibiae: 16.5–19.4; mesotarsi: 7.2–8.9; metafemora: 21.2–25.4; metatibiae: 24.6–27.9; metatarsi: 9.8–11.5.

♀. General colour of dried specimen light brown.

Head (Fig. 6g): Flat, rectangular almost 1.5 times as long as wide, with slight longitudinal impression medially. Clypeus brown. With triangular impression between bases of antennae. With a darker stripe behind eyes. Eyes projecting almost hemispherically. Antennae as in ♂, projecting beyond abdominal tergite VIII.

Thorax: Pronotum as in ♂. Mesonotum about 5.5 times as long as pronotum, with distinct median line, slightly broadened in posterior one-fifth, indistinctly granulated. Mesonotum slightly more than 2.5 times as long as metanotum, the latter structured as mesonotum.

Legs (Fig. 8i): As in ♂, but profemora and tibiae green, their edges stronger lamellate, probasitarsi only slightly longer than following four tarsomeres combined and metafemora (Fig. 9i) only with two teeth ventro-apically.

Abdomen (Fig. 10i): Metanotum about 2.5 times as long as median segment. Abdominal tergites I to V increasing, V to VIII decreasing in length. III to V widest segments. VIII slightly shorter than IX, X distinctly shorter than VIII. VIII slightly, IX distinctly tectiform, X with raised median line. Cerci elongate and slender, slightly curved inwards. Subgenital plate light green, projecting beyond abdomen by the length of VIII, slightly curved upwards from middle on, lateral margins almost touching dorsally. Apex of subgenital plate acute.

Measurements (length in mm): Body: 117.8; head: 5.9; pronotum: 4.8; mesonotum: 27.2; metanotum: 10.1; median segment: 3.8; profemora: 28.1; protibiae: 28.6; protarsi: 12.0; mesofemora: 21.8; mesotibiae: 18.5; mesotarsi: 11.7; metafemora: 27.6; metatibiae: 28.5; metatarsi: 12.8.

3.5 *Oncotophasma maculosum* **n. sp.**
(Figs. 3, 5a, 8k, 9k, 10k)

Material examined (1 ♀)

Holotype ♀, 1 egg ex ovipositor: Costa Rica, Puntarenas, S San Vito, Wilson Botanical Garden, 1160 m, 27.VIII.1999 [OZ].

Name

Maculosum, Latin for spotted, referring to the black spots on the body and extremities.

Diagnosis

♀, egg. A small *Oncotophasma*-species. Easily recognised by the yellow colour, the black spots on the extremities and the completely smooth body. Egg bullet-shaped, light greyish brown. – ♂ unknown.

Distribution

Costa Rica. Only known from the type locality.

Description

♀. Body completely smooth. General colour of dried specimen yellow with small brownish areas on thorax and abdomen and black spots on extremities. ♂ unknown.

Head: Rectangular, parallel sided, one-third longer than wide, with a round impression between antennae and a mediolongitudinal impression in posterior half. Clypeus whitish, yellowish brown in middle. Scapus rectangular, flat, margins compressed dorsolaterally, apex blackened. Pedicellus globose, half as long and two-thirds as wide as scapus. Antennae filiform, projecting beyond abdominal segment VII. Third antennomere almost as long as scapus and pecicellus combined. Following antennomeres elongate, dark brown ventrally and yellow dorsally.

Thorax: Pronotum rectangular, widely emarginated laterally, with a cross-like impression. Anterior margin of pronotum broad and distinct, posterior one broader, but indistinct. Pronotal anterolateral edges with a sublateral longitudinal impression. Mesonotum 6 times as long as pronotum, with fine mediolongitudinal impression. Metanotum as mesonotum, but less than half as long.

Legs: Profemora strongly curved and compressed basally, trapezoid in cross-section, with prominent ventromedian carina, bearing several small black spots. Tibiae slightly longer than profemora, trapezoid in cross-section, slightly raised dorsally straight before apex. Protarsi almost half as long as protibiae. Probasitarsi (Fig. 8k) as long as following four tarsomeres combined; second tarsomere about as long as third and fourth combined; claws slightly darker in colour. Mesofemora trapezoid in cross-section, also with prominent ventromedian carina and several black spots. Mesotibiae as protibiae, but slightly shorter than mesofemora. Mesotarsi longer than half length of mesotibiae. Mesobasitarsi slightly shorter than combined length of following four tarsomeres. Hindlegs (Fig. 9k) as midlegs, but metabasitarsi as long as following four tarsomeres combined.

Abdomen (Fig. 10k): Metanotum about 2.8 times as long as median segment. Abdominal segment II twice as long as median segment. II to V increasing in length and width, VI shorter than V. VII to X distinctly narrower than VI. VII shorter than VIII, VIII as long as IX. VIII raised dorsoposteriad. X shorter than IX, carinate dorsomedially, with a broad notch posteriorly. Supra-anal plate semicircular, tectiform medially. Abdominal sternite VII with black preopercular organ. Cerci straight, dark. Subgenital plate projecting tergite X almost by the length of IX and X combined, with a short ventromedian impression behind its middle, curved upwards in apical one-third. Lateral margins of subgenital plate touching dorsally in apical one-third.

Measurements (length in mm): Body: 74.3; head: 3.9; pronotum: 3.0; mesonotum: 18.3; metanotum: 8.0; median segment: 2.8; profemora: 19.0; protibiae: 20.8; protarsi: 9.8; mesofemora: 15.0; mesotibiae: 13.3; mesotarsi: 7.3; metafemora: 18.2; metatibiae: 20.5; metatarsi: 9.6.

Egg (Fig. 5a): Capsule brown, bullet-shaped, slightly depressed laterally, covered with fine irregular carinae. Areas between carinae leather-like. Ventral surface almost straight, dorsal one angled, highest at anterior margin of micropylar plate. Capsule surrounded by a narrowed collar anteriorly. Micropylar plate suboval, about one-third of length of capsule, narrowed anteriad. Median line distinct. Operculum oval, flat, inserted in a positive angle of about 35°, with long bristles in center. – Measurements (in mm): Length: 3.85; width: 1.55; height: 1.85.

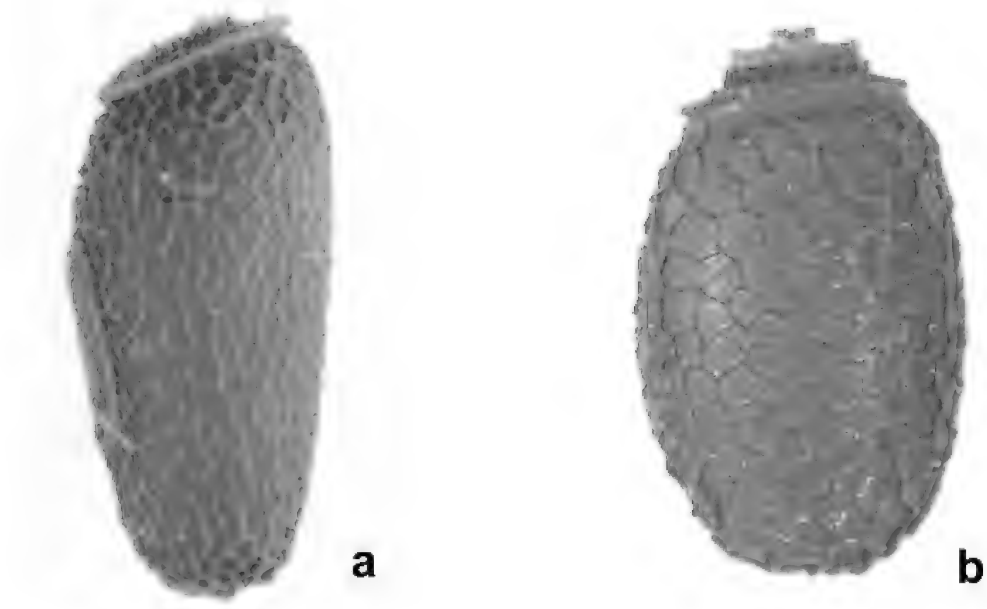


Fig. 5. Eggs of *Oncotophasma* spp., lateral aspect. – (a) *O. maculosum* n. sp.; (b) *O. martini.*

3.6 *Oncotophasma martini* (Griffini, 1896)
(Figs. 5b, 6e, 7e, 8e, 8j, 9e, 9j, 10e, 10j)

Bostra martini Griffini, 1896: Griffini 1896: 10. – Original type data: "Un unico ♂, privo di zampe anteriori. Foreste presso la laguna della Pita (Darien)"; Type in MIZT. – Shelford 1909: 362.

Oncotophasma martini: Kirby 1904: 351; Giglio-Tos 1910: 39; Rehn 1904: 59; Hebard 1922: 358, 1933: 125; Robinson 1968: 183ff, figs. 1–2 (behaviour); Harman 1990: 6; Zompro 2001a: 228; Otte & Brock 2005: 233.

= *Paradiapheromera strumosa* Brunner v. Wattenwyl, 1907: Brunner v. Wattenwyl 1907: 317. – Original type data: "♂. Chiriqui in Peru (Coll. m.), Darien (Mus. Paris)"; Types in NHMW and MNHN. – Shelford 1909: 347, pl. 5, fig. 4 ♂; Hebard 1922: 358 (synonym of *Bostra martini* Griffini, 1896); Zompro 2001a: 228 (lectotype).

Material examined (10 ♂♂, 2 ♀♀, 5 eggs)

Holotype ♂: Columbia, Forests by the lagoon of Pita, Darien (Dr. E. Festa) [MIZT]; 1 ♂: coll. Br. v. W., Chiriqui (Panama), Staudinger, 20.V.[18]87 [NHMW]; 1 ♂: coll. Br. v. W., Chiriqui (Panama), Staudinger [NHMW], lectotype and paralectotype of *Paradiapheromera strumosa* Brunner v. Wattenwyl, 1907; 1 ♂: Costa Rica, Puntarenas, Monteverde, Ecological Farm, N-Waterfall, medium dry Forest, 1330 m, 15.VIII.1999, leg. I. Richling [OZ]; 1 ♂: Gatun, Panama, 28.VII.–5.VIII.1916, D. E. Harrower [MHNG]; 1 ♂: Costa Rica [MHNG]; 1 ♂: without data [MHNG]; 1 ♂, 2 ♀♀, 5 eggs: Reared by P. E. Bragg 1990, from material collected by Allan Harman in Costa Rica, Monteverde, 1989 [coll. P. E. Bragg PEB-450-453].

Diagnosis

♂. Differing from other ♂♂ of *Oncotophasma* species by the strongly swollen posterior part of the metanotum. ♂ probasitarsi only slightly longer than following

four tarsomeres combined. ♂ stouter and darker in colour than ♂ of *O. limonense* n. sp.

Distribution

Panama, Costa Rica and Colombia. Peru seems to be based on an error, Chiriqui is a town in Panama.

Description

♂. General colour of dried specimens dark orange brown to reddish brown. Body slightly shiny. BRUNNER v. WATTENWYL's paralectotype has a white colouration on abdominal segments IX and X.

Head (Fig. 6e): Trapezoid, slightly narrowed posteriad, compressed dorsoventrally, with an oval impression between bases of antennae. Behind eyes with a darker stripe and a whitish stripe ahead of it. Anterior half of head with a dark spot, posterior half reddish brown with fine but distinct mediolongitudinal impression. Clypeus whitish. Distance from hind margin of eye to posterior margin of head slightly less than 2.5 times diameter of the hemispherically projecting eyes. Antennae reaching apex of abdomen. Scapus broad, rectangular, flattened dorsoventrally. Pedicellus cylindrical, three quarters as wide and half as long as scapus. Third antennomere 1.5 times as long as scapus, slightly narrower than scapus. Fourth antennomere about half as long as third, the following increasing in length, from middle on of irregular length.

Thorax: Pronotum as long as but narrower than head, slightly emarginated laterally, with a fine longitudinal and a fine transverse impression. Anterior margin of pronotum broad and flat, posterior margin twice as wide, also flat. Mesonotum strongly elongated. Its anterior part (length of pronotum) as wide as pronotum, the rest distinctly wider than pronotum. Metanotum (Fig. 7e) slightly more than twice as long as pronotum; anterior half with several flat irregular round to oval impressions; posterior half strongly broadened laterally and dorsally, impressions deeper. Sides of metanotum of same structure as posterior half.

Legs: Profemora curved and slightly compressed basally, trapezoid in cross-section, their interior and exterior edges prominent and projecting as well dorsally as ventrally; medioventral carinae also slightly projecting, bearing a small tooth apically. Protibiae distinctly longer than profemora, edges also prominent and projecting. Protarsi (Fig. 8e) sulcate dorsally. Probasitarsi distinctly longer than following tarsomeres combined; second segment slightly longer than third and fourth combined; third twice as long as fourth; fifth segment broadened distad, almost as long as third and fourth combined; claws strongly curved in anterior third. Mesofemora also trapezoid in cross-section, edges less prominent than in profemora, their intero- and exteroventral edges with darker, very fine granulation, medioventral carinae with several dark granulae and with two major black spines before the joint. Mesotibiae as protibiae, mesotarsi as protarsi. Metafemora (Fig. 9e) broadened, almost round dorsally, bearing five broad but flat longitudinal carinae dorsally, their extero- and interoventral edges slightly granulated, medioventral carinae bearing about seven large black spines, of which two are placed close to the joint. Metatibiae and metatarsi as protibiae and -tarsi.

Abdomen (Fig. 10e): Median segment half as long as metanotum, smooth and shiny, posterior two-thirds raised. Abdominal segment II narrower but one-third

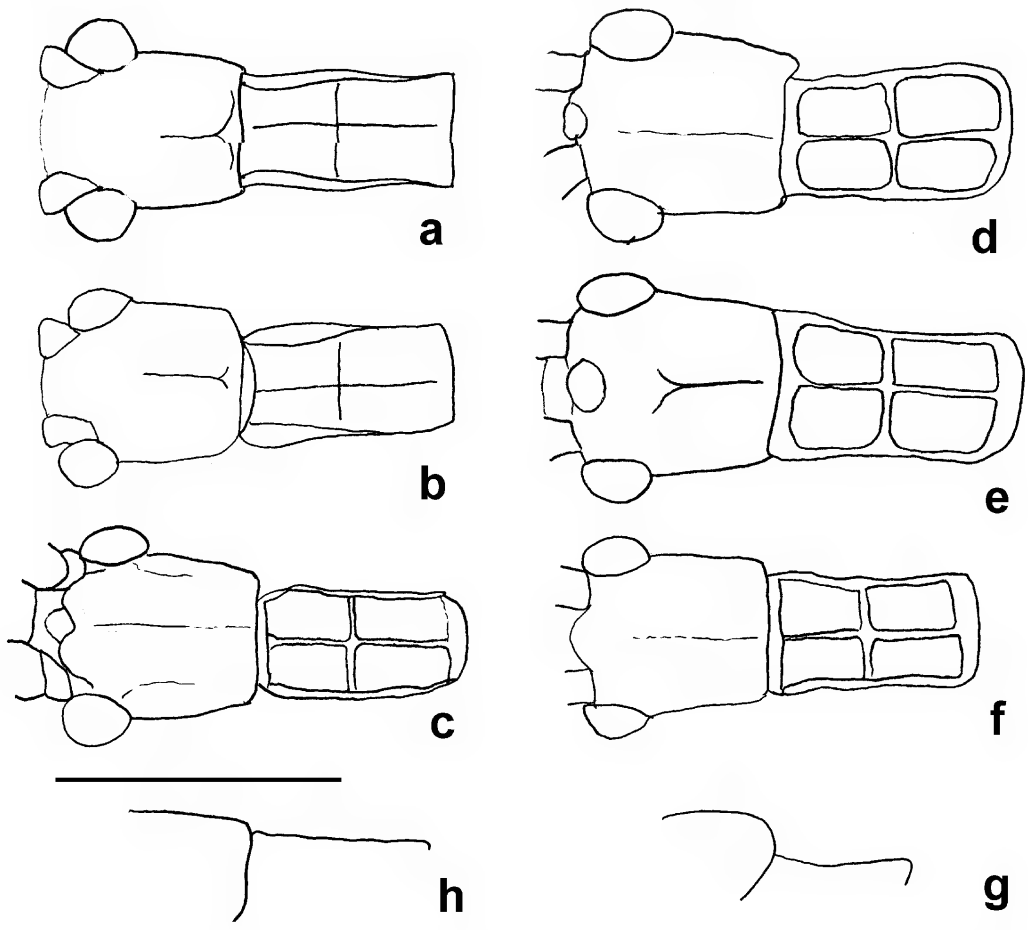


Fig. 6. Heads of *Oncotophasma* spp.; ♂♂, dorsal aspect (a–f); ♀♀, lateral aspect (g, h). – (a) *O. coxatum*; (b) *O. podagricum*; (c) *O. modestum*; (d) *O. limonense* n. sp.; (e) *O. martini*; (f) *O. armatum*; (g) *O. limonense* n. sp.; (h) *O. weitschati* n. sp. – Scale: 5 mm.

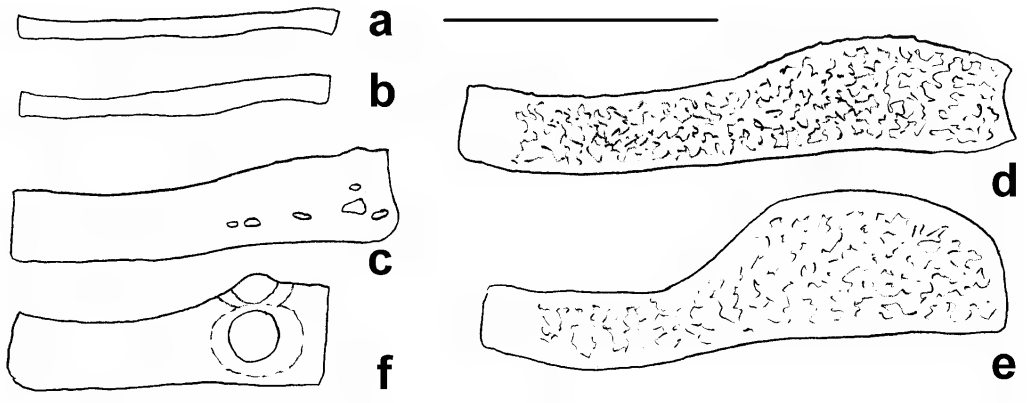


Fig. 7. Metanota of *Oncotophasma* spp., ♂♂, lateral aspect. – (a) *O. coxatum*; (b) *O. podagricum*; (c) *O. modestum*; (d) *O. limonense* n. sp.; (e) *O. martini*; (f) *O. armatum*. – Scale: 5 mm.

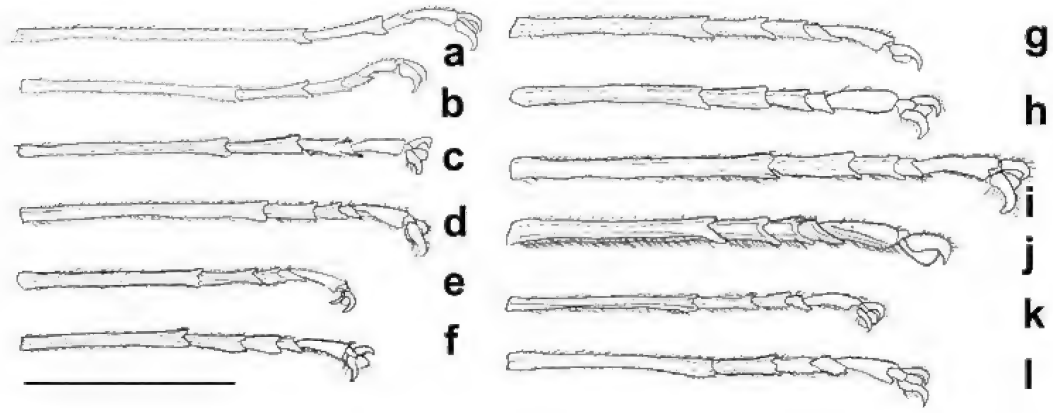


Fig. 8. Protarsi of *Oncotophasma* spp., lateral aspect; ♂♂ (a–f), ♀♀ (g–l). – (a) *O. coxatum*; (b) *O. podagricum*; (c) *O. modestum*; (d) *O. limonense* n. sp.; (e) *O. martini*; (f) *O. armatum*; (g) *O. coxatum*; (h) *O. modestum*; (i) *O. limonense* n. sp.; (j) *O. martini*; (k) *O. maculosum*; (l) *O. weitschati* n. sp. – Scale: 5 mm.

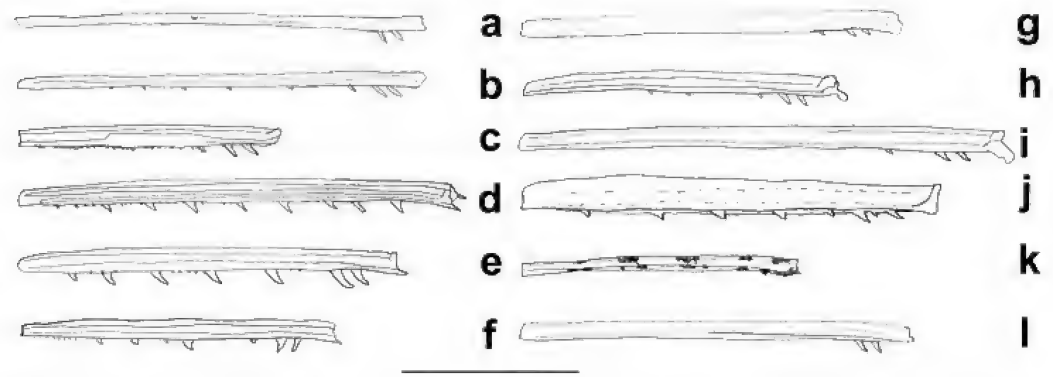


Fig. 9. Metafemora of *Oncotophasma* spp., lateral aspect; ♂♂ (a–f), ♀♀ (g–l). – (a) *O. coxatum*; (b) *O. podagricum*; (c) *O. modestum*; (d) *O. limonense* n. sp.; (e) *O. martini*; (f) *O. armatum*; (g) *O. coxatum*; (h) *O. modestum*; (i) *O. limonense* n. sp.; (j) *O. martini*; (k) *O. maculosum* n. sp.; (l) *O. weitschati* n. sp. – Scale: 5 mm.

longer than median segment, not shiny. II to V increasing, V to VII decreasing in length. VIII trapezoid, with broad median carina, strongly broadened, posterior margin almost 3 times as wide as that of II. IX also trapezoid, narrowed posteriad, almost tectiform, slightly shorter than VIII. X slightly shorter than IX, subquadrate, posterolateral edges broadly separated by a deep impression. Posterior half of X with a flat mediolongitudinal impression, beside this impression with two round projections posteriorly. Poculum as high as tergites VIII and IX, not projecting beyond middle of X, posterior part raised subvertically. Cerci oval-triangular in shape, two-thirds as long as X, with moderately acute apex.

Measurements (length in mm): Body: 64.8–82.3; head: 3.8–4.3; pronotum: 2.8–3.5; mesonotum: 16.2–22.3; metanotum: 6.9–10.4; median segment: 4.1–5.4; profemora: 18.9–25.8; protibiae: 19.2–24.3; protarsi: 7.9–11.2; mesofemora: 16.1–20.9; mesotibiae: 15.2–18.3; mesotarsi: 7.5–10.8; metafemora: 21.1–26.3; metatibiae: 22.1–30.4; metatarsi: 8.7–13.8.

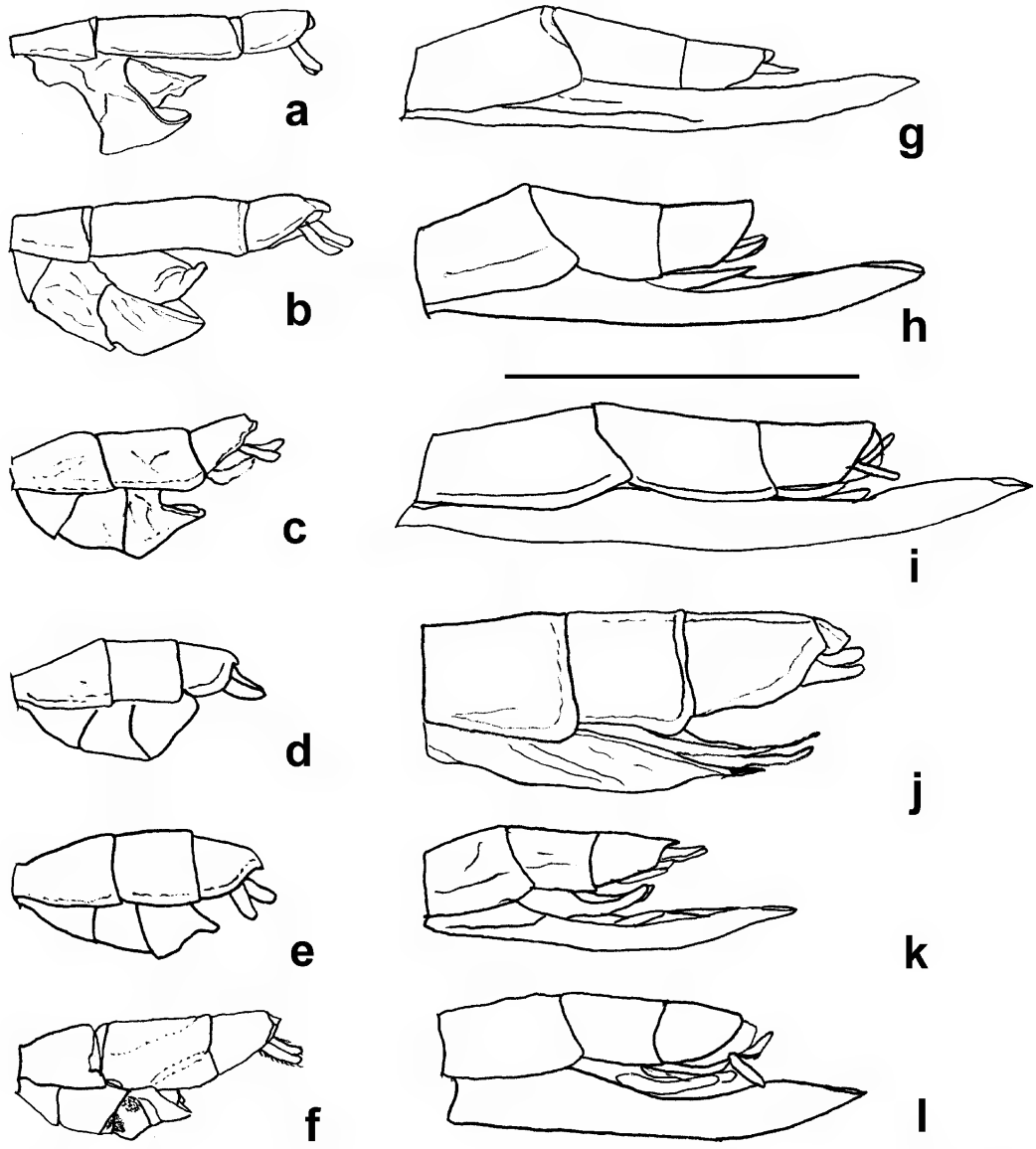


Fig. 10. Terminal abdominal segments of *Oncotophasma* spp., lateral aspect; ♂♂ (a–f), ♀♀ (g–l). – (a) *O. coxatum*; (b) *O. podagricum*; (c) *O. modestum*; (d) *O. limonense* n. sp.; (e) *O. martini*; (f) *O. armatum*; (g) *O. coxatum*; (h) *O. modestum*; (i) *O. limonense* n. sp.; (j) *O. martini*; (k) *O. maculosum* n. sp.; (l) *O. weitschati* n. sp. – Scale: 10 mm.

♀. General colour uniformly green or brown.

Head: Flat, rectangular, with impressed median line and a rhombic impresssion between the bases of the antennae. Eyes projecting about hemispherically. Antennae projecting beyond abdominal segment III. Scapus flat, rectangular. Pedicellus cylindrical, two-thirds as long and two-thirds as wide as scapus. Remaining antennomeres elongate, third segment 1.5 times as long as pedicellus.

Thorax: Pronotum slightly shorter and narrower than head. Disc with fine, cross-shaped impression; emarginated and with distinct margins laterally and anteriorly;

without raised margin posteriorly. Mesonotum slightly wider than pronotum anteriorly, weakly granulose, strongly elongate, about 4.5 times as long as pronotum, with distinct ridge mediodorsally. Small rudiments of tegmina present. Metanotum less than half as long as mesonotum, with same structure.

Legs: Profemora strongly curved and compressed basally, interodorsal and interoventral edges strongly lamellate. Protibiae slightly shorter, trapezoid in cross-section, edges lamellate. Mesofemora trapezoid in cross-section, slightly broadened, with several small teeth ventromedially. Mesotibiae with several teeth ventromedially. Metafemora (Fig. 9j) and metatibiae as in midlegs, but teeth slightly larger. Tarsi (Fig. 8j) as in ♂, but basitarsi comparatively shorter, slightly serrate laterally in basal half.

Abdomen (Fig. 10j): Segment II one-third longer than median segment, III one-third longer than II. III to V slightly increasing in length, V to VII considerably decreasing in length and width. VII slightly compressed laterally. VIII shorter than VII, tectiform, broadened posteriad, IX shorter than VIII, tectiform, X about as long as VIII, with distinct ridge mediodorsally, emarginated posteriorly. Supra-anal plate projecting, convex posteriorly, with a ridge medially. Preopercular organ produced as a short, longitudinal ridge. Subgenital plate short, not surpassing beyond middle of tergite X (reared material; supposed to be longer in wild specimens), acute apically, with a longitudinal ridge ventromedially. Genital valves projecting. Cerci ellipsoid.

Measurements (length in mm): Body: 75.0–78.0; head: 4.8–5.1; pronotum: 3.8–4.1; mesonotum: 16.5–17.0; metanotum: 6.4–7.1; median segment: 3.8–4.0; profemora: 17.0–17.6; protibiae: 16.5–16.9; protarsi: 8.8–9.0; mesofemora: 12.1–12.6; mesotibiae: 11.0–11.6; mesotarsi: 6.6–7.2; metafemora: 16.2–16.9; metatibiae: 16.5–17.0; metatarsi: 8.5–9.0.

Egg (Fig. 5b): Capsule dark greyish brown, oval in lateral view, flattened laterally, with irregular honeycomb-shaped structure on leather-like surface. Operculum inserted at a negative angle of about 15°, with a raised structure covering about half of the surface; inside this structure with a transparent orange knob. – Measurements (in mm): Total length: 2.40; capsule length: 2.15; width: 1.25; height: 1.45.

Remarks

Hebard (1922: 358) refers to specimens from Panama (6 ♂♂: Gatun, Panama, 6.–22.VIII.1916, D. E. Harrower [2 NHMW, examined; 4 ANSP, not examined]; 2 ♀♀ from Barro Colorado Island [ANSP, not examined]). These specimens are considerably larger than the other material examined.

The ♂ differs by having a yellow head with a black stripe on the genae and the vertex. This stripe is present on the mesothorax, too. Legs yellow, knees darkened. – Measurements (length in mm) (after Hebard 1922: 358, not verified): Body: 83–92; mesonotum: 21.4–24.9; median segment: 4–4.8; profemora: 23.8–28.1; protibiae: 26.7–31.5; mesofemora: 18.5–22; metafemora: 26–29.

♀ (after Hebard 1933: 125, emended): Colour green or brown. The colouration is uniform. The hirsute mesonotum (more distinctly and generally anteriad) and metanotum show subobsolete tubercles and rugae laterad, the latter being unspecialised. The sharp rectangular apex of the operculum does not reach as far as the middle of the tenth tergite, but the filiform apices of the ovipositor, recurved distad,

reach almost to its apex. The femora have the genicular lobes of all but the internal of the apical spined, but much more weakly than in the male. The profemora are decidedly more lamellate. The mesofemora have six to nine ventro-internal, the metafemora six to ten ventro-internal small spines. The metatibiae are also armed with a row of decidedly smaller dorsal spines. – Measurements (length in mm) (after HEBARD 1922: 358, not verified): Body: 89.2; mesonotum: 21.3; metanotum: 9.2; median segment: 4.0; profemora: 20.7; metafemora: 19.8.

Further material is required to decide if this is just based on variation or if it is another (sub)species.

3.7 *Oncotophasma modestum* (Brunner v. Wattenwyl, 1907) (Figs. 6c, 7c, 8c, 8h, 9c, 9h, 10c, 10h)

Dyme modesta Brunner v. Wattenwyl, 1907: BRUNNER V. WATTENWYL 1907: 324. – Original type data: "♂. Chiriqui (Godman)"; Type in BMNH. – SHELFORD 1909: 348.
Oncotophasma podagricum: ZOMPRO 2001a: 229, pl. 3: 44 [not *O. podagricum* Stål, 1875, misidentified].
Oncotophasma modestum: OTTE & BROCK 2005: 233.

Material examined (3 ♂♂, 1 ♀, 1 egg)

Holotype ♂: V. de Chiriqui below 4,000 ft., CHAMPION [BMNH]; 1 ♂, 1 ♀, 1 egg ex ovipositor: Costa Rica, Hondura, 6.VI.1936, F. NEVERMANN ded., Eing. Nr. 41, 1937 [ZMH]; 1 ♂: La Trinidad, Costa Rica [MTD].

Diagnosis

♂♀, egg. Stout species. Meso- and metafemora of both sexes with two large spines ventro-apically. Posterior half of ♂ metanotum rough, weakly raised. ♂ probasitarsi only slightly longer than following four tarsomeres combined. Thorax and abdomen of ♀ distinctly granulate. Egg bullet-shaped, brown.

Distribution

Panama, Costa Rica.

Description

♂. General colour of dried specimens reddish brown.

Head (Fig. 6c): Longer than wide, distinctly narrowed posteriad. With round impression between antennae. Vertex with mediolongitudinal impression. Eyes projecting hemispherically. Antennae filiform, projecting beyond abdomen. Scapus and pedicellus greyish. Scapus flattened, slightly longer than wide. Pedicellus two-thirds as long and two-thirds as wide as scapus. Following antennomeres brown, elongate.

Thorax: Pronotum rectangular, shorter and narrower than head, with mediolongitudinal and mediotransversal impression; anterior and lateral margins fine, but distinct. Posterior half of pronotum with two diverging impressions. Mesonotum 5 times as long and as wide as pronotum, broadened posteriorly, with fine line dorsomedially. Metanotum (Fig. 7c) less than half as long as mesonotum, evenly broadened posteriad; anterior half with distinct carina dorsomedially, posterior half slightly raised, with leather-like structure.

Legs: Profemora strongly curved and compressed basally, trapezoid in cross-section, with a distinct furrow between the dorsal carinae and a slightly raised carina

medioventrally; curved part green, straight part brown. Protibiae slightly longer than profemora, also trapezoid in cross-section and with raised medioventral carina. Protarsi half as long as protibiae. Probasitarsi (Fig. 8c) longer than combined length of following four segments; second segment longer than third and fourth combined; third twice as long as fourth; fifth a little longer than third, broadened apicad; claws as long as fourth, strongly curved, with blackish apex. Mesofemora trapezoid in cross-section, also with raised carina ventromedially; with one large and one indistinct tooth before the joint. Mesotibiae also trapezoid in cross-section, about as long as mesofemora. Mesotarsi half as long as mesotibiae. Mesobasitarsi slightly shorter than following four mesotarsomeres combined, otherwise mesotarsi as protarsi. Metafemora (Fig. 9c) as mesofemora, flattened ventrally before the joint and bearing two large ventro-apical spines. Raised metafemoral ventromedian carina with several smaller spines of irregular size. Metatarsi as mesotarsi.

Abdomen (Fig. 10c): Median segment about half as long as metanotum. Abdominal segment II one-third longer than median segment. II to V increasing, V to VII decreasing in length. VIII whitish dorsally, slightly shorter than VII, trapezoid, strongly dilated posteriad. IX slightly longer than VIII, tectiform, narrowed posteriad. X slightly shorter than VIII, slightly emarginated posteriorly. Supra-anal plate small, distinctly projecting. Cerci simple, elongate and slender, slightly curved inwards. Vomer broad triangular. Subgenital plate hardly projecting beyond IX.

Measurements (length in mm): Body: 57.6–60.1; head: 3.1–3.5; pronotum: 2.4–2.8; mesonotum: 14.6–14.8; metanotum: 6.1–6.2; median segment: 2.8–2.9; profemora: 19.4; protibiae: 21.1; protarsi: 10.1; mesofemora: 13.5–14.2; mesotibiae: 14.0; mesotarsi: 7.1; metafemora: 19.3; metatibiae: 20.0; metatarsi: 11.3.

♀. General colour uniformly brown, legs lighter in colour.

Head: Almost rectangular, slightly narrowed posteriad, with an indistinct median line which is deeper impressed in the posterior one-third and a rhombic impression between bases of antennae. Eyes projecting slightly more than hemispherically. Antennae projecting beyond abdominal tergite III. Scapus flat, rectangular. Pedicellus three-quarters as long and two-thirds as wide as scapus. Following antennomeres elongate, third segment almost as long as scapus and pedicellus combined.

Thorax: Pronotum almost rectangular, slightly broadened posteriad, with a thin, slightly raised median line. Anterior margin of pronotum distinct, posterior one broad and flat, lateral margin slightly emarginated in anterior half. Mesonotum 4.5 times as long as pronotum, strongly granulated, with raised median line. Mesosternum slightly weaker granulated. Metanotum less than half as long as mesonotum, of same structure.

Legs: Profemora strongly curved and compressed basally, trapezoid in cross-section; interodorsal carina lamellate, interoventral carina slightly projecting, ventromedian carina distinctly raised. Protibiae as long as profemora, trapezoid in cross-section. Protarsi (Fig. 8h) about half as long as protibiae. Probasitarsi slightly shorter than length of following four segments combined. Probasitarsi about 3 times as long as second tarsomere; second segment almost 3 times as long as third; fourth disc-shaped, one-third as long as third; fifth tarsomere slightly longer than second; claws strongly curved. Mesofemora trapezoid in cross-section, with distinct carina ventromedially, bearing two spines ventro-apically. Mesotibiae slightly shorter than profemora, also trapezoid in cross-section. Mesotarsi slightly shorter than meso-

tibiae. Mesobasitarsi distinctly shorter than following four tarsomeres combined; second tarsomere one-third as long as first; third two-thirds as long as second; fourth less than half as long as third; fifth almost as long as second and third combined. Metafemora (Fig. 9h) as mesofemora, but longer, bearing two large ventroapical spines and a smaller third one. Metatibiae as mesotibiae, but longer. Metatarsi as mesotarsi, but longer, about half as long as metatibiae.

Abdomen (Fig. 10h): Abdominal segments I to VII also granulated, VIII to X distinctly weaker. Median segment almost half as long as metanotum. I to IV increasing, IV to VII decreasing in length and width. VIII slightly shorter than VIII, tectiform, raised dorsoposteriad. IX slightly longer than VIII, tectiforme, compressed laterally, lowered posteriad. X shorter than VIII, almost straight posteriorly. Supra-anal plate minute, slightly projecting. Cerci short, slender, triangular. Subgenital plate projecting beyond abdomen by the length of tergites IX and X combined, curved upwards in posterior half, lateral edges touching dorsally in posterior half, with acute apex.

Measurements (length in mm): Body: 77.8; head: 4.2; pronotum: 3.9; mesonotum: 18.0; metanotum: 7.3; median segment: 3.1; profemora: 18.0; protibiae: 18.0; protarsi: 9.3; mesofemora: 13.2; mesotibiae: 11.7; mesotarsi: 8.2; metafemora: 17.5; metatibiae: 17.1; metatarsi: 9.6.

Egg: Capsule brown, flattened bullet-shaped, straight ventrally, convex dorsally. Surface covered with irregular carinae. Micropylar plate elongated oval, one-third as long as capsule, its exterior margin broad, structured regularly, interior part elevated, structured irregularly, chamfered. Median line as a sharp edge reaching to the polar area. Operculum inserted in a negative angle of 70°, oval, with a sharp, elevated margin, set with hair-like structures. – Measurements (in mm): Total length: 3.60; capsule length: 3.50; width: 1.45; height: 1.65.

3.8 *Oncotophasma podagricum* (Stål, 1875)
(Figs. 6b, 7b, 8b, 9b, 10b)

Bostra podagrica Stål, 1875: Stål 1875: 79. – Original type data: "♂. Chiriqui. (Coll. Brunner.)"; Type in NHRS. – Shelford 1909: 360; Redtenbacher 1908: 409; Hebard 1933: 125.

Oncotophasma podagrica: Rehn 1904: 60; Kirby 1904: 351.

Oncotophasma podagricum: Otte & Brock 2005: 233; not Zompro 2001a: 229 (misidentification, see chapter 3.7).

Material examined (2 ♂♂)

Holotype ♂: Panama [NHRS]; 1 ♂: Rio Negro, Ost-Columb. [MTD].

Diagnosis

♂. Metanotum not swollen, without tubercles or humps. Posterior part of metanotum of same structure as anterior one, slightly and equally broadened posteriad. Probasitarsi longer than following four tarsomeres combined. – ♀ and egg unknown.

Distribution

Panama, Colombia.

Description

♂. General colour red brown.

Head (Fig. 6b): Slightly longer than wide, depressed dorsoventrally, with a rhombic impression between bases of antennae. A white line extends from above the eye to the posterior margin of the head. Posterior part of head with a deep longitudinal impression medially. Eyes projecting hemispherically. Antennae projecting beyond abdomen considerably. Scapus rectangular, flattened dorsoventrally, with distinct edges laterally. Pedicellus globose, two-thirds as long as scapus. Third antennomere conical, following ones much longer than wide.

Thorax: Narrower than head, rectangular, flat. Anterior margin of pronotum very fine, posterior one absent. Disc with a fine cross-shaped impression. Mesonotum strongly elongate, about 6 times as long as and as wide as pronotum, slightly narrowed shortly before end. Metanotum (Fig. 7b) about half as long as mesonotum; anterior half blackish brown, posterior one reddish brown, slightly raised laterally and dorsally.

Legs: Reddish brown. Profemora strongly curved and compressed basally, slightly trapezoid in cross-section, anterior one-quarter green, ventral edges slightly lamellate. Protibiae slightly longer than profemora, about quadrate in cross-section, ventral edges pointed. Probasitarsi (Fig. 8b) slightly longer than following four segments combined; second segment less than third as long, about as long as third and fourth combined; fourth half as long as third; fifth, including claws, as long as second. Mesofemora green in basal one-third, trapezoid in cross-section. Mesotibiae subquadrate in cross-section, longer than mesofemora. Mesobasitarsi about as long as combined length of following four mesotarsomeres; the latter as in protarsus. Metafemora (Fig. 9b) trapezoid in cross-section, with raised ventromedian carina; this carina bears several small black spines in a steady distance to each other; before the joint with two large spines standing close to each other. Metatibiae and metatarsi as in midleg.

Abdomen (Fig. 10b): Median segment two-thirds as long as abdominal segment II. II to IV increasing, IV to VII decreasing in length. VIII tectiforme, half as long as VI. IX about as long as V, strongly tectiform. X half as long as IX, globose. Posterior margin of X with triangularly projecting edges and a broad notch medially. Cerci half as long as X, elongate and slender, curved inwards. Vomer elongate triangular. Subgenital plate narrow, strongly extended ventrally.

Measurements (length in mm): Body: 68.0–73.2; head: 3.1–3.2; pronotum: 2.7–2.9; mesonotum: 17.4–18.6; metanotum: 8.3–9.0; median segment: 1.6–1.7; profemora: 20.3–21.1; protibiae: 23.9–24.3; protarsi: 9.1–9.4; mesofemora: 14.7–15.1; mesotibiae: 14.9–15.8; mesotarsi: 6.4; metafemora: 20.3–21.1; metatibiae: 23.1; metatarsi: 8.5.

3.9 *Oncotophasma weitschati* **n. sp.**
(Figs. 4, 6h, 8l, 9l, 10l)

Material examined (1 ♀)

Holotype ♀: Costa Rica, Guanacasta, Parque Nacional Santa Rosa, Estación biológica, Pitila, Volcan Orosi, Caro Orosilito, 10,58°N 85,24°W, 800–1100 m, 20.VI.1996, B. Kreusel leg. [SMNS].

Name

Dedicated to Dr. WOLFGANG WEITSCHAT (Geologisch-Paläontologisches Institut, Hamburg, Germany), as an acknowledgement for several years of good cooperation.

Diagnosis

♀. Easily recognised within *Oncotophasma* by the strongly globose head. – ♂ and egg unknown.

Distribution

Costa Rica. Only known from the type locality.

Description

♀. Medium sized for the genus. General colour of dried specimen reddish brown, legs slightly greenish brown.

Head (Fig. 6h): Head dorsally smooth, enlarged, leather-like under 15× magnification, brownish green. About 1.5 times as long as wide, subparallel. Occiput strongly globose. Posterior edges rounded. Vertex with a short furrow posteriomedially and with two longer longitudinal furrows submedially. Eyes projecting hemispherically. Behind eyes darkened. Both antennae broken off shortly before middle. Scapus subquadrate, flat, with acute edge interiorly. Pedicellus half as long as scapus, globose. Antennomeres blackened and shiny ventrally. Following antennomeres elongate and bristled.

Thorax: Pronotum flat, rectangular, considerably shorter and narrower than head, with a cross-like impression, margins broad, separated from center of pronotum by a deep furrow. Posterior half of pronotum with a round furrow posterolaterally. Mesonotum strongly elongate, with same surface structure as head, median line present, but indistinct. Metanotum as mesonotum, but shorter, separated from median segment by an indistinct line.

Legs: Typical for the genus. Profemora greenish brown, strongly curved and compressed basally. Protibiae greenish brown, distinctly longer than profemora. Probasitarsi (Fig. 8l) distinctly longer than following tarsomeres combined. Midlegs coloured as forelegs. Mesofemora with a distinct edge ventromedially and a pair of black teeth ventro-apically. Mesotibiae about as long as mesofemora. Mesobasitarsi slightly shorter than following four tarsomeres, with several strong black bristles ventrobasally. Hindlegs (Fig. 9l) as midlegs, but comparatively longer, ventrobasal bristles of metabasitarsi stronger, almost spinose.

Abdomen (Fig. 10l): All abdominal segments smooth. Median segment less than half as long as metanotum. Abdominal segment II 1.5 times as long as median segment. III longer than II, IV longest, V as III, VI as II, VII little shorter than VI. VIII shorter than VII, 1.5 times as long as X, IX little longer than X. Abdominal sternite VII with black preopercular organ posteromedially. Subgenital plate projecting beyond abdomen by the length of X, curved upwards posteriad, margins of apical third almost touching dorsally. Cerci simple, of half length of X.

Measurements (length in mm): Body: 84.2; head: 4.7; pronotum: 3.7; mesonotum: 22.1; metanotum: 8.2; median segment: 3.5; profemora: 21.8; protibiae: 23.0; protarsi: 10.2; mesofemora: 16.0; mesotibiae: 15.9; mesotarsi: 8.4; metafemora: 20.8; metatibiae: 22.0; metatarsi: 10.3.

3.10 Keys to species of *Oncotophasma*

The key presented here is a preliminary one, since both sexes are not known from all species.

Males

1 Metanotum with two distinct tubercles (Fig. 7f). ..... ***O. armatum***
– Metanotum without two small humps, but often distinctly swollen (Fig. 7a–c, d, e). 2
2 Metanotum strikingly swollen, swollen part differently structured (Fig. 7d, e); metatibiae distinctly serrate ventrally. 3
– Metanotum at best slightly swollen, smooth dorsally (Fig. 7a–c), metatibiae at best with a few spines ventrally. 4
3 Body mainly reddish brown, probasitarsi only slightly longer than following four tarsomeres combined (Fig. 8e). ..... ***O. martini***
– Body mainly orange brown, probasitarsi much longer than following four tarsomeres combined (Fig. 8d). ..... ***O. limonense* n. sp.**
4 Posterior part of metanotum rough (Fig. 7c). ..... ***O. modestum***
– Posterior part of metanotum smooth, not distinctly rough (Fig. 7a, b). 5
5 Probasitarsi slightly longer than following four tarsomeres combined (Fig. 8b); metanotum equally broadened posteriad (Fig. 7b). ..... ***O. podagricum***
– Probasitarsi much longer than following four tarsomeres combined (Fig. 8a); metanotum parallel sided, almost of same width in its whole length (Fig. 7a). ..... ***O. coxatum***

Females

1 Vertex globose. ..... ***O. weitschati* n. sp.**
– Vertex flat. 2
2 Body and extremities yellow with blackish spots. ..... ***O. maculosum* n. sp.**
– Body uniformly coloured. 3
3 Mesonotum strongly granulated. ..... ***O. modestum***
– Mesonotum at best weakly granulated. 4
4 Head of same width as pronotum, 2 times as long as wide. ..... ***O. coxatum***
– Head wider than pronotum. 5
5 Metafemora with two distinct spines ventro-apically (Fig. 9i). ..... ***O. limonense* n. sp.**
– Metafemora with about six to nine ventral spines over the full length (Fig. 9j). .. ***O. martini***

Eggs

1 Capsule bullet-shaped in lateral view (Fig. 5a). 2
– Capsule oval in lateral view (Fig. 5b). ..... ***O. martini***
2 Colour brown. ..... ***O. modestum***
– Colour light greyish brown. ..... ***O. maculosum* n. sp.**

4 Discussion

The tarsomeres of *Oncotophasma* species are dorsally furrowed like those in *Clonistria* Stål, 1875, indicating a sister-group relation between these two taxa. Another synapomorphy are the spine-like ventrolateral bristles at the base of the basitarsi. They are present in *Clonistria*-species, too, but are distinctly larger in *Oncotophasma* species.

The phylogenetic relationships within *Oncotophasma* are difficult to investigate, because one species is known only from the male sex and two from females only. A synapomorphy of the following species is the strikingly different structure of the anterior and posterior half of the metanotum. It is slightly raised and swollen in *O. modestum*. *O. limonense* and *O. martini* are characterised by the strongly swollen posterior part of the male metanotum, which might be a synapomorphy of the two

species. Both inhabit the same areas, but no intermediate forms have been traced. Therefore it seems to be certain that both are valid species. A synapomorphy of *O. armatum* and *O. maculosum* is the spotted colouration of the body and the extremities. It cannot be absolutely excluded that *O. maculosum* represents the female of *O. armatum*, but this is unlikely because the protarsi of both species show the same relation to the remaining protarsomeres, which is not seen in any other species of *Oncotophasma*. *O. weitschati* differs from all other species by the globose head and the dark colouration of the female. The eggs are only known from *O. modestum*, *O. maculosum* and *O. martini*. They differ mainly in the colour and in the shape of the opercula. The egg of *O. martini* is more oval in shape, while those of *O. modestum* and *O. maculosum* are more bullet-shaped. The material examined does not show any significant intraspecific variation.

Additional material is desirable for a deeper insight into this striking genus.

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